



# Why Foot-Tapping Is Important but Not Enough?

## Some Methodological Problems in the Embodied Approach to Musical Meaning

**Tomasz Szubart**

Jagiellonian University in Krakow  
*tomasz.szubart@doctoral.uj.edu.pl*

Received 28 October 2017; accepted December 2017.

### Abstract

In this short paper I critically analyze Marc Leman's embodied approach to musical meaning and representation, suggesting that its explanatory value is not sufficient in order to be a good alternative for theories encompassing the concept of representation.

**Keywords:** music, representation, explanation, embodiment.

Researchers operating in the paradigm of embodied cognition since recently have become interested in the explanation of the phenomena of musical cognition, musical experience or musical perception. Several ideas were proposed (among the most influential, Leman, 2010), being centered around the thesis that (1) music is perceived by the whole body, not only by the brain or the mind. In other words, (musical) agents are not only minds, or minds reduced to brains, or simply brains, but whole bodies. The idea that music is perceived by the body does not seem controversial, given the understanding of musical phenomena as simply physical waves which approach the listener, causing bodily changes (eardrums, blood pressure, heartbeat). What seems to be controversial, however, is that the thesis (1), let us call it the Embodied Music Perception Thesis, entails—what seems to be stronger epistemically—the thesis that (2) only (or predominantly) studies of bodily reactions to (and interactions with) music can help us understand how music cognition works. Let us call the latter the Embodied Music Cognition Explanation Thesis. While understanding the importance of the research on body-music interaction and in agreement with (1), I am going to state a few questions about (2), taking the problem of musical meaning as a working example.

## 1. The Importance of the Body in Music Listening, and Why It Is Not the Case Here

Let us be clear: without the body, music seems to be impossible. We play musical instruments with our fingers, hands and legs, we perceive music with our bodies, we communicate with music, we dance, we express the feeling of rhythm by clapping, shaking heads, etc. As music is a strictly human phenomenon (music understood as a temporal, dynamical structure, described by such qualities as melody, harmony, rhythm etc.), being universal among cultures and used in social or religious contexts, it simply has to be of huge importance to acknowledge that the body plays a role when we want to speak about music perception. Movement caused (or rather correlated, in the embodied paradigm) by listening to music, like tapping the feet, helps to organize time, and actually influences the perception of time. Every musician knows how bodily movements help to keep the rhythm and cooperate while playing in a band. It is enough to think about the conductor of a symphony orchestra, who, literally, expresses certain qualities of music by bodily movement, albeit with a specific code.

Plenty of research in cognitive sciences of music has supplied a huge body of evidence for the thesis of the influence of the body on music perception, and vice versa (e.g. Maes, 2013; Banerjee, 2015; overview in Hodges, 2009). This seems to be beyond dispute. The problems start when we try to involve body-music interaction descriptions in the explanation of how music cognition works. It seems that the difference between descriptive and explanatory functions of a theory is not often clear. I am trying to argue here that while Leman's views on music could be seen as important from the descriptive point of view, i.e. providing a good description and illustration of the importance of the body in music perception, they lack explanatory power when it comes to the problem of musical *meaning*, the explanatory power provided, by contrast, by the rival paradigms (e.g., cognitive neuroscience).

The fact that listening to fast-beat music is correlated with a faster heart rate, or galvanic skin response, or just movement, does not explain directly how changes in tempo influence our thinking about a given piece of music, i. e. how the content of musical representation (or musical meaning) is determined. One could eliminate the concept of cognition and thinking as processing referential representations, bringing in the idea of 'spatio-temporal representations'. Spatio-temporal representations are a very useful tool to explain the role of rhythm, gesture, or tempo changes (Naveda and Leman, 2010). It seems to be unclear, however, how incorporating the idea of spatio-temporal representation in a model of musical cognition could help to understand how, for example, complicated harmonies interfere, producing an impression of a specific musical meaning, or, if not a meaning, at least a form.

## 2. The Classical Problem of Musical Meaning

The classical philosophical problem of musical meaning, unsurprisingly, has its roots in ancient Greek philosophy. To put it shortly, the problem consists of three—basic—questions: (Q.1) Does music have a meaning? If yes (Q2) what is that meaning or rather (Q3) what does “meaning” in this case mean? For the purpose of this paper, it is enough to

briefly mention the traditional views of (1) emotivism (e.g., Schopenhauer 2011), (2) linguistic paradigm (e.g., Langer, 1979) and (3) formalism (e.g., Hanslick, 1986). According to (1) music: (a) contains emotions, (b) refers to emotions or (c) evokes emotions. According to (2) music can be understood as a language (with, obviously, syntax and, more controversially, semantics) or as a sign system somehow “similar” to language. Formalism (3) is a view according to which it is impossible for music to have any meaning as its “understanding” consists purely in the recognition of its form or structure. As it can be seen (1) and (2) do not have to be contradictory. Another specific concept of music comes from the Sophists who claimed that music does not convey any meaning; neither do we listen to music because of its form. Rather, the reason why humans are interested in music is strictly physical (or, more precisely, biological) pleasure.

Contemporary philosophical discussion is still lively, being concentrated mostly around the emotional (expressive) meaning of music (e.g., Kivy, 1990; Davies, 1994), although the results of research on the, broadly understood, cognitive science grounds are more and more often used in attempts to answer the traditional philosophical questions (e.g., Vempala and Russo, 2013, and, from the point of view of cognitive neuroscience, Koelsh, 2013).

This brings us to the cognitive aesthetics of music. Research in cognitive neuroscience, cognitive psychology and evolutionary psychology has been brought into philosophical discussion by some philosophers (e.g., Nussbaum, 2007), and, on the other hand, some philosophical theories were applied as models in the sciences mentioned above. This situation caused a vast methodological confusion in the field and calls for some form of categorization. In the first group mentioned above, analogically to other problems in the philosophy of mind, we could, generally, distinguish two possible attitudes: reductive and eliminativist. The reductive approach would focus on the application of findings from empirical sciences to old philosophical problems, showing that science can adequately explain problems such as musical meaning, representation or beauty. What follows is that musical meaning would be reduced from an experience, representation or other mental objects to, for example, a specific neural reaction of the brain (in neuroscience) or a realization of an evolutionary strategy (in evolutionary psychology). If one would like to go through the reduction process, one should define bridge laws to be applied when reducing certain levels and provide an applicable theory of explanation.

The eliminativist approach, on the other hand, would focus on the conviction that the old-fashioned philosophical (or folk-psychological) concept of musical meaning is roughly meaningless and actually harmful for the development of science. Proponents of this attitude would “eliminate” philosophical notions of musical meaning or representation (in the manner of Churchland, 1981) and would talk instead (usually on the grounds of neuroscience) of brain structures and, at best, brain functions. It does not seem to be clear which attitude—reductive or eliminative—would be more consistent with the embodied paradigm. Is the embodied approach reductive or eliminative and, if neither, what is it?

### 3. The Embodied Approach to Representation

Now, let us have a closer look at the proposed model of representation in the embodied paradigm. In the article “An Embodied Approach to Music Semantics” (2010) Marc Leman proposes a view in which the embodied approach to musical representation needs to encompass a broader look at semantics in general. The author lists classical views on semantics (representational, causal, etc.) next to the idea of corporeal semantics. In the corporeal paradigm, representation is embodied, produced and processed by the whole body. As Leman (2010) puts it:

... corporeal semantics can be characterized as (i) multi-modal, because it combines audio, movement, and other modalities (visual, haptic, bioparametric) with each other through action-perception couplings, (ii) mediated, because it focuses on the mechanisms that transfer energetic forms to experiences, or experiences to energetic forms in the physical environment. Included in this approach is the fact that the mediator has its own dynamics that may interfere in the process, (iii) combined objective/subjective, because the one cannot be studied without the other. (p. 52)

It seems that this idea could be suitable for the embodied approach; the problem seems to be, however, that it seems to be not explanatory enough. How is a musical representation of, let us say, Bach’s Double Violin Concerto structure created? The answer that it is modeled by gestures or bodily movements, even symbolically or metaphorically, seems to be implausible. How do representations differ according to this paradigm? How to model the role of representation among the other cognitive functions? The idea of corporeal meaning seems to be not explanatorily rich enough to be treated as a good rival for referential, or causal (e.g., Ruth Millikan’s teleo-semantic, 1984) theories of representation. By saying that meanings are not in the bodies, one does not have to think they are in heads, as Leman assumes:

Meanings may not be things that exist within the minds of people (or in the brains of people), but instead, things that exist as a mediated relationship between mind and energetic forms. Meanings cannot be calculated (computed) as resulting from structures only, but as resulting from actions, that is, processes that mediate intentions to physical realities (for example through sensory motor interactions with physical objects, or through social interactions). (2010, p. 56)

Meanings might be simply nowhere, as they could be understood as functions used to model our cognition. How those functions are realized is a different question. The view that meanings are dependent on social constructions (externalism) and that meanings are created by action (pragmatism) or the view that meanings are ecologically useful tools (as in Milikan’s teleo-semanticism mentioned above), or played a role in evolution (Cross, 2009) are not new. All of those theories propose interesting accounts in which the reference to humans and their interaction with their ecological niche is crucial, without, however, referring to the foggy idea of meanings-in-the-body.

That human cognition in its actual form would not exist without human bodies is a statement that nowadays only a few (e.g., traditional functionalists) seem to deny. But, as in linguistics, musical cognition is based on human-perceived sound *s t r u c t u r e s*, described by different sciences from acoustics and basic neurobiology to more complex

neurosciences, evolutionary sciences and psychology/sociology to philosophy and mathematics. All of those disciplines refer to specific models of explanation (classical, causal, mechanical) and have their own methodology. The answers proposed to similar questions, like the one considering the possibility of music being meaningful, are often different and seemingly contradictive. What seems to connect them is the, broadly understood, idea of representation. Representational (symbolical) approach has been widely accepted, as it offers several possible explanations of how our cognition works *in general*, while the ideas suggesting bodily movements and reactions as the main bearer of representations seems to fail to explain how those representations function in our mental architecture. And the explanation of the functioning, or at least modeling, of the mental architecture seems to be one of the main goals of cognitive science.

On the other hand, without understanding how our body shapes our cognition, we would be left on the empty formal ground of structures and forms. Studies in developmental linguistics or psychological studies of subjects with motor impairment (Oudgenoeg-Paz & Rivière, 2014), have shown strong correlations (both top-down and bottom up) between body action and cognition.

It is not especially controversial anymore that (at least to some extent) the body shapes the mind, and it is especially clear in the field of music perception. Obviously, playing music, dancing or listening to music requires a body as a primal tool for achieving musical experience, and the role of embodied musical aesthetics could be seen as describing the part played by the body in this experience. Some further steps have been made (Matyja, 2015) to deal with certain methodological obstacles the embodied paradigm meets, by suggesting that Bechtel's mechanical model of explanation could be incorporated in the embodied music cognition paradigm. While the mechanical model of explanation is widely and often successfully used in cognitive sciences, the question of how such mechanistic explanation would work when we take the "body and its environment" into account still awaits an answer. It just seems that referring to the body as an explanatory tool in the research aiming to describe and explain some higher cognitive human functions, like the musical representation here, seems to be—until now—unsuccessful. Some of the "classical" empirical approaches, as in cognitive neuroscience of music, provide more efficient models (mostly due to their representational and functional characteristics) to explain the riddle of musical meaning.

## References

- Banerjee, A. (2015). Music and its effect on body, brain/mind: A study on Indian perspective by neurophysical approach. *Insights in Blood Pressure*, 1(1), 1–11.
- Cross, I. (2009). The evolutionary nature of musical meaning. *Musicae Scientiae* 13(2Suppl), 179–200.
- Churchland, P. M. (1981). Eliminative materialism and the propositional attitudes, *Journal of Philosophy*, 78, 67–90.

- Davies, S. (1994). *Musical meaning and expression*. Ithaca, NY: Cornell University Press.
- Hanslick, E. (1986). *On the musically beautiful: A contribution towards the revision of the aesthetics of music*. (G. Payzant, Trans.). Indianapolis, IN: Hackett.
- Hodges, D. A. (2009). Bodily responses to music. In S. Hallam, I. Cross, M. Thaut (Eds.), *The Oxford handbook of music psychology* (pp. 121–130). Oxford, UK: Oxford University Press.
- Kivy, P. (1990). *Music alone: Philosophical reflections on the purely musical experience*. Ithaca, NY: Cornell University Press.
- Koelsch, S. (2012). *Brain and music*. Oxford, UK: Wiley-Blackwell.
- Langer, S. (1979). *Philosophy in a new key: A study in the symbolism of reason, rite, and art*. Cambridge, MA: Harvard University Press.
- Leman, M. (2010). An embodied approach to music semantics. *Musicae Scientiae* 14(1), 43–67.
- Matyja, J. R. (2015). The next step: Mirror neurons, music, and mechanistic explanation. *Frontiers in Psychology*, 6, 409.
- Millikan, R. (1984). *Language, thought, and other biological categories: New foundations for realism*. Cambridge, MA: Bradford/MIT Press.
- Naveda, L., & Leman, M. (2010). The spatiotemporal representation of dance and music gestures using topological gesture analysis (TGA). *Music Perception: An Interdisciplinary Journal*, 28(1), 93–111.
- Maes, P. J. (2013). The influence of body movements on children's perception of music with an ambiguous expressive character. *PLoS One*, 8(1), e54682.
- Oudgenoeg-Paz, O., & Rivière J. (2014). Self-locomotion and spatial language and spatial cognition: insights from typical and atypical development. *Frontiers in Psychology*, 5, 521.
- Schopenhauer, A. (2011). *The world as will and representation*. Volume 1. (J. Norman, A. Welchman, C. Janaway, Eds.). Cambridge, UK: Cambridge University Press.
- Vempala, N. N., & Russo, F. A. (2013). Exploring cognitivist and emotivist positions of musical emotion using neural network models. In R. L. West & T. C. Stewart (Eds.), *Proceedings of the 12<sup>th</sup> International Conference on Cognitive Modeling* (pp. 257–262). Ottawa, ON: Calerton University.